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mEducator

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*e***Content***plus*

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[1]   OJ L 79, 24.3.2005, p. 1.

1 Table of content

2   Project Objectives

Although there is an abundance of medical educational content available in individual EU academic institutions, this is not widely available or easy to discover and retrieve, due to lack of standardized content sharing mechanisms. The aim of mEducator is to implement and standards and models in the field of e-learning in order to enable specialized state-of-the-art medical educational content to be discovered, retrieved, shared and re-used across European higher academic institutions.

Some of the mEducator goals and objectives contribute directly to the overall and specific objectives of the eContentplus programme and Action 4.1:

- Implement and extend specifications and standards on a critical mass of medical educational content and provide recommendations for standards adoption and promotion across Europe.
- Implement learning resource discovery and retrieval specifications, standards and commonplace technologies, to facilitate the seamless exchange of existing medical education content over the web, supporting semantic interoperability, and content discovery and retrieval management.
- Support the efficient and seamless sharing and use of formal, specialized, state-of-the-art and pedagogically sound medical educational content across Europe.
- Compare best practice solutions referring to both user generated and professional generated content
- Utilise open educational resources and provides an opportunity to compare practices of standardising Web2.0 content alongside with Medical Research Academic content for educational purposes.
- Experiment with the impact on technology enhanced user interaction and community learning (Web2.0).
- Builds upon previously funded research and experience while involving new member states and quite good geographic coverage and aimed impact.

European-wide collaboration is required for two reasons. First, to achieve a critical mass for multi-type medical educational content; second, to address and extend best practice and recommendations to as many EU countries as possible. To do so, mEducator builds up pan-European synergies in order to go beyond what has already been achieved by existing or past related projects.

3   Consortium

mEducator consortium consists of 14 partners, representatives of 9 EU member countries, which act in close collaboration towards the objectives of the project. Some partners, mainly Medical Schools, act as content providers of educational content for medical education, while others as technology providers who provide state-of-the-art technological solutions or expertise for sharing and repurposing of multi-type content in medical education. There are also partners who act as pedagogic experts and/or users and will play a major role in the project evaluation of the sharing solutions and the specification of recommendations. A mechanism for associate partners or individual users wishing to enter the consortium on a non-funded basis is also foreseen.

Participant full name	Country	Role in the project
Aristotle University of Thessaloniki (AUTH)	GR	Coordinator, Technology provider, Content provider, User/Evaluation, Dissemination
University of Cyprus (UCY)	CY	Technology Provider, Content provider, User/Evaluation, Dissemination
Democritus University of Thrace (DUTH)	GR	Content provider, Technology provider, User/Evaluation, Dissemination
MEDTING Medical Exchange Limited (ex. SITUSI Limited)	IR	Content provider, Technology provider, Dissemination
Technical University of Cluj-Napoca (UTCN)	RO	Technology provider, Pedagogical expert
Université Nice Sophia Antipolis (UNS)	FR	Content provider, User, Dissemination
Medical University Plovdiv (MUPLOVDIV)	BG	Pedagogical expert, Content provider, User
Università degli studi di Catania (UNICT)	IT	Pedagogical expert, Content provider, User/Evaluation
University of Helsinki (UH)	FI	Pedagogical expert, Evaluation
St George's, University of London (SGUL)	UK	Pedagogical expert, Standardisation Body, Technology and Content Provider
Succubus Interactive	FR	Content and Technology Provider
The Open University (OU)	UK	Technology Provider
Coventry University	UK	Content provider, Technology provider
European Cervical Cancer Association (ECCA)	FR	User/Evaluation

4   Project Results/Achievements

Survey: Study on content sharing functional requirements

As a first action within mEducator activities, a public survey was conducted to identify users' perceptions and preferences in terms of educational content sharing in medicine and related fields.

The purpose of the survey was to:
- identify current perceptions about the concept of educational content, educational content repurposing and educational content sharing
- bring up and elucidate current needs, preferences and considerations in terms of quality, model of 'sharing economics', and intellectual property rights issues
- highlight overall desired functionality of an environment for educational content sharing.

The survey was conducted in autumn 2009 by means of a questionnaire, designed to highlight participants' views while giving them the chance to express freely their opinion. The questionnaire was anonymous and was designed to be as open-ended as possible.

Most of the participants were academic teachers, healthcare professionals and students (postgraduates and undergraduates), while technical support experts and citizens also had strong representation. In terms of web technology literacy/penetration the majority of participants were familiar with web and web 2.0 technologies in general. Users' motivation and needs when sharing educational content seems to be mainly "for a major course re-design in terms of content and teaching method", but also for finding state-of-the-art material and the same content in a different form (see

section 5 for a few more details). When it comes to detailed system functionalities, features that are mostly reported as crucial are: searching by type of content, being informed when new content of interest is available, searching by medical taxonomies, and bookmarking the resources.

The findings helped the consortium stipulate the overall desired functionality of mEducator, which however will be fine-tuned in the following few months via use case scenarios for each solution and result to the technical requirements and specifications.

Intellectual Property Rights (IPR) issues

mEducator, having received consultation from experts highly involved and acknowledged in the Intellectual Property sector, has established recommendations and decisions regarding the resolution of IPR issues. The licensing scheme recommended for legal open but conditional sharing and repurposing of multi-type content in medical education is the Creative Commons licensing scheme, although other licenses will also be accepted.

A set of guidelines has been made available to the partners and the public, designed in the form of workflows in an interactive platform (Open Labyrinth) to assist partners and stakeholders researching on IPR issues related to the content they would provide.

More details are available in Section 7.

Metadata scheme

Within the first year of mEducator the consortium has initiated the process of creating the mEducator metadata scheme. This process included the analysis of Healthcare LOM, the evaluation of other specifications and standards, the incorporation of extensions for repurposed content (taking into account novel approaches on entity identifiers over the web) and a recommendation for a mEducator metadata scheme, which is presented as an independent schema that fits and addresses the needs of the mEducator educational content types and sharing functionalities.

More details are available in Section 7.

Healthcare LOM editor – mEducator editor

In order to facilitate the process of creating metadata within mEducator the consortium has decided to develop a metadata editor. Metadata editors are tools that enable the creation of xml files in a user-friendly way; otherwise the creation of xml files would be a time-consuming process almost impossible to be processed by non-technical target audience. The first step was to create a Healthcare LOM editor which is currently being customized to the mEducator metadata scheme to serve as the mEducator editor.
The editor is available at: http://kedip.med.auth.gr/HealthcareLOMEditor/index.html

International dissemination

The project goals and objectives, as well as the main technical considerations, were presented in three mEducator International dissemination events organised in the first project year.

The"1st International Workshop on Multi-type Content Repurposing and Sharing in Medical Education" was organised and held in Cyprus, as part of the International Technology & Applications in Biomedicine conference on 4-7 of November 2009. This session was entirely focused on mEducator, and was open to all attendees of the conference.

The 2nd International Workshop on Multi-type Content Repurposing and Sharing in Medical Education" was organised and held in Plovdiv, Bulgaria, on 21 January 2010.

Screenshots from 1st and 2nd International Workshops on Multi-type Content Repurposing and Sharing in Medical Education

The 2nd International Conference on Virtual Patients and MedBiquitous Annual conference, organised by mEducator partners was held in London on April 26-28 2010. This conference provided a number of partners to share their experience and learning from mEducator with the wider medical e-learning and technical standards community.

MetaMorphosis testbed collaboration environment

The consortium developed a web 2.0 environment as a testbed for testing and finalizing the proposed meta-data scheme and as a means to organize provided content and guide, organize and record the pilot repurposing that takes place within the initial phases of the project. This environment (named MetaMorphosis) is based on novel web 2.0 notions and technology and is in fact a social network spanning two different dimensions: of humans (social) and of educational resources (objects linking and inheritance).

The MetaMorphosis is available at: http://metamorphosis.med.duth.gr

More details are available in Section 7.

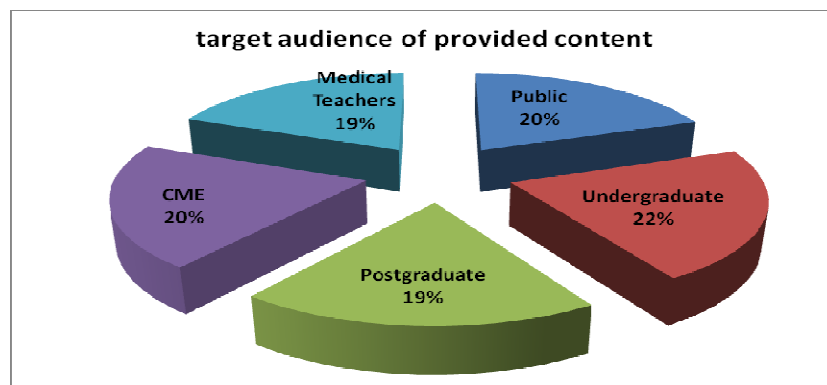# 5   Target Users & their Needs

There are three main types of users in mEducator: Medical Educators (clinical/non clinical, in academia), Medical Students (under- and post-graduates), and Residents & Specialized Doctors (continuing medical education). The involvement of these three groups account for a variety of needs ranging from better awareness of the uses and potentialities of Learning Content Management Systems, as well as, efficient search, and discovery of educational content, to the technical and intellectual property rights related issues involved in sharing contents. In addition, users need ease of use of educational standards, access to high quality, well described overspecialized, interoperable and applied to different cultures & languages educational content in state-of-the-art topics. , guidelines on how to easily repurpose educational material and access to and use of toolkits & guidelines to create, edit & share and re-purpose educational content, as well as, access to and (transparent/seamless) use of metadata translation tools, and finally access to demonstrators and easy use of collaboration environments to collaboratively participate in authoring different scenarios of training, repurposing, standardising and uploading material.

The survey conducted by mEducator revealed that users' motivation and needs when sharing educational content seems to be mainly "for a major course re-design in terms of content and teaching method" but also for finding state-of-the-art material and the same content in a different form. On the other hand, the main consideration when giving out educational content is whether their content is of satisfactory quality. Participants are more likely to share their conventional educational content rather than alternative and/or user generated content. Authorship and history of creation plays a major role for potential users, while either eponymous review or peer-group voting seems to be significant. As for the IPR issues, it seems that more than half of the participants have no concern about IPR issues
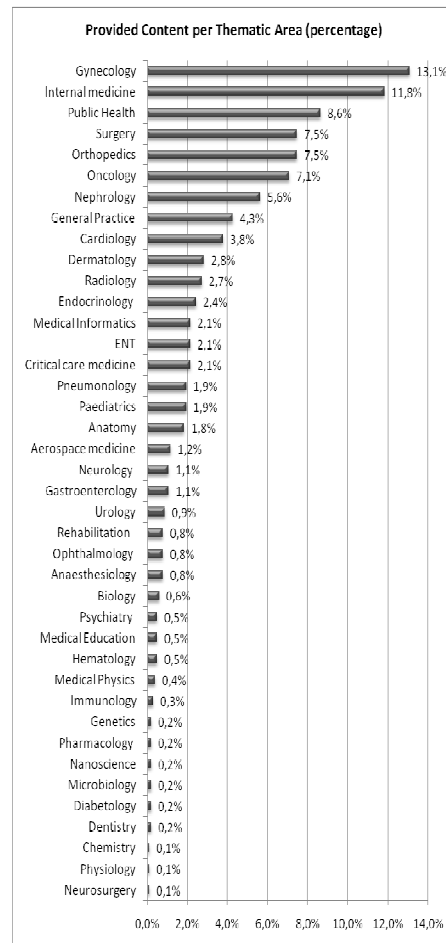
when they are about to share their own material with others, however they would not be willing to deal with content that cannot be changed or used for derivative works, which signifies that they are highly interested in content re-purposing and when they use content developed by others most often they change it to fit their own educational purposes.

6   Underlying Content

At this first stage of the project, partners have identified around 3.000 content items. These items are intended for different target audience groups, namely undergraduate and postgraduate students, professional in continuing education, medical teachers, as well as the public. There is a good representation of content for these target group categories, as shown in the figure below.

The subject areas covered by the available content items are illustrated in the figure below.

Provided Content per Thematic Area (percentage)

Thematic Area	Percentage
Gynecology	13,1%
Internal medicine	11,8%
Public Health	8,6%
Surgery	7,5%
Orthopedics	7,5%
Oncology	7,1%
Nephrology	5,6%
General Practice	4,3%
Cardiology	3,8%
Dermatology	2,8%
Radiology	2,7%
Endocrinology	2,4%
Medical Informatics	2,1%
ENT	2,1%
Critical care medicine	2,1%
Pneumonology	1,9%
Paediatrics	1,9%
Anatomy	1,8%
Aerospace medicine	1,2%
Neurology	1,1%
Gastroenterology	1,1%
Urology	0,9%
Rehabilitation	0,8%
Ophthalmology	0,8%
Anaesthesiology	0,8%
Biology	0,6%
Psychiatry	0,5%
Medical Education	0,5%
Hematology	0,5%
Medical Physics	0,4%
Immunology	0,3%
Genetics	0,2%
Pharmacology	0,2%
Nanoscience	0,2%
Microbiology	0,2%
Diabetology	0,2%
Dentistry	0,2%
Chemistry	0,1%
Physiology	0,1%
Neurosurgery	0,1%

7 Summary of Activities

7.1 Repurposing contexts and procedures

The mEducator consortium has researched into various possible types of content repurposing and has established a set of content repurposing contexts and their definitions.

- Repurposing to different languages
- Repurposing to different cultures
- Repurposing for different pedagogical approaches
- Repurposing for different educational levels
- Repurposing for different disciplines or professions
- Repurposing to different content types
- Repurposing for different technology
- Repurposing for people with different abilities
- Repurposing to Educational Content
- Changes in the content itself

The procedure for repurposing medical educational content in general can be complex and may vary greatly from one repurposing case to another. However, a list of major best practices for content repurposing, especially within the mEducator project, could be proved valuable. The procedure involves the following steps:

- Identify the source (or parent) educational resource or resources. This includes keeping a record of the original resource or resources, and/or the location and especially any related metadata (if they exist).

- Intellectual property rights for the parent resource(s) should be closely examined to determine whether the parent resource(s) allow repurposing and if yes, to which extent. This information should be recorded and kept together with any repurposed resource.

- Describe the repurposing context. This should include references to the repurposing contexts described in Section 4. Whenever more than one context is related, they should all be mentioned. Whenever there is not a clear correspondence to one of the contexts described here, a detailed description of the context should be given.

- Present in detail the new educational context/setting for which the repurposed resource is being prepared. This should ideally include educational objectives, expected learning outcomes and assessment methods, as well as instructions on how to use the resource with certain teaching methods and strategies. If such information is available for the initial resource or resources, then any differences with the related information for the repurposed resource should be highlighted and elaborated on. If such information is not available for the parent resource(s), it is strongly recommended that it is compiled for the repurposed resource.

- The repurposed resource should be described with the related mEducator metadata.

- Intellectual property rights for the repurposed resource should be resolved, taking also into account any relevant IPR of the parent resource(s).

- The quality of the repurposed resource should be assessed following any quality assessment that may be applied/developed for parent resources (within mEducator or within the intended educational context of the resource or even in general) and especially assessed against its stated repurposed context.

- Any difficulties, bottlenecks, experience and best practices arising from each particular repurposing should be reported. This includes total repurposing effort.

7.2 IPR Guidelines and Workflows

A very important challenge addressed in the first year of mEducator was the issue of Intellectual Property Rights (IPR). All partners have been informed of the legal aspects of intellectual property and issues on Copyright legislation as well as the acts of creators protected. The outcome was a resolution regarding the necessity of a license for all content items to become available through mEducator. The consortium recommended the use of the Creative Commons licensing scheme, although any other license will be accepted. The above recommendations and decisions were established following consultation by experts highly involved and acknowledged in the IP sector.

The adoption of the Creative Commons licensing model in mEducator advocates an initiative aimed at deeper impact on learning. It builds on Open Educational Resources (OER), to create a global culture of learning, which is targeted at preparing people for thriving in a rapidly evolving, knowledge-based world.

The Creative Commons licensing model:
- overcomes the rigidity of the "All Rights Reserved" status and introduces the "Some Rights Reserved" status which is ideal for the design and implementation of projects such as mEducator.
- includes terms and clauses for open distribution of content
- is easy to use by an author or right-holder to grant permissions for any use of their works
- has no cost
- is enhanced by technological elements, i.e. meta-data software code
- is applicable to all sorts of creative works i.e. for all possible types of educational material to be made available through mEducator.
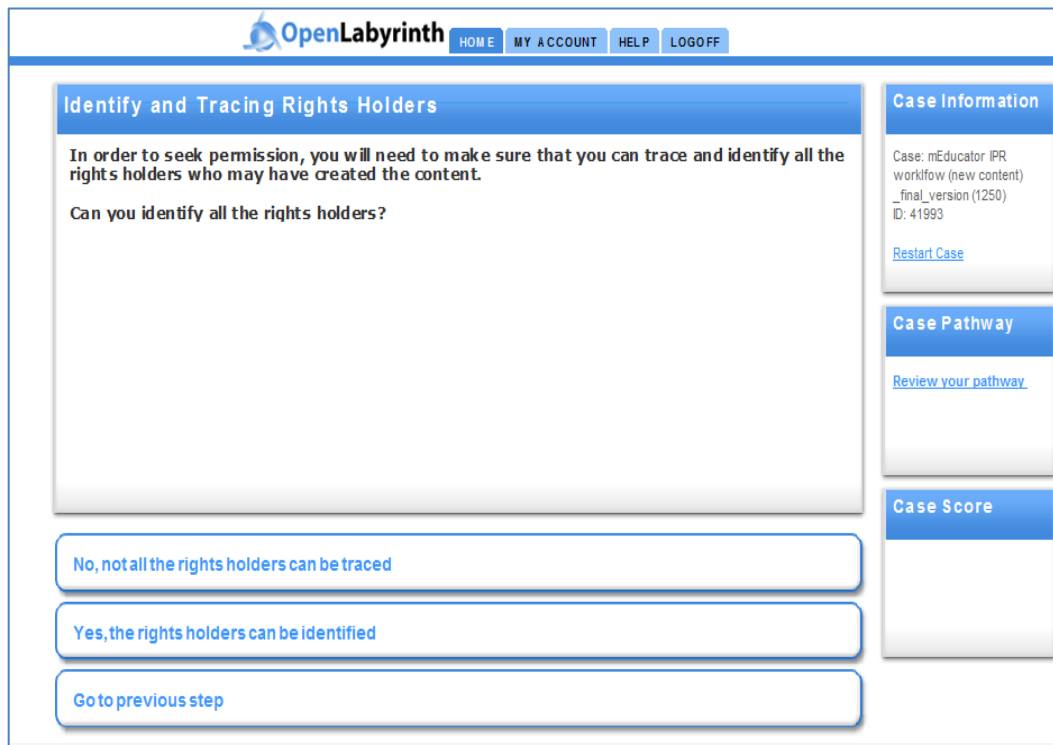
The mEducator project is evolving into a "medical and health sciences gateway." And it is understood as an opportunity for synergy and mutual benefit between the national and international medical and

health sciences communities and the international OER movement, particularly in the sense of evolving into a decentralized learning environment.

The consortium has developed guidelines, designed in the form of workflows, in an interactive platform (Open Labyrinth) to assist partners and stakeholders researching on IPR issues related to the content they would provide. The workflows are publicly available at:

http://labyrinth.sgul.ac.uk/openlabyrinth/mnode.asp?id=qwnw2gcgxlrdbu3lpfvu3lpfvqajxhq (for existing provided content)

http://labyrinth.sgul.ac.uk/openlabyrinth/mnode.asp?id=qwnw2gcf4jesnqajxhqqajxhqqdknam (for repurposed content)

Screenshot from the workflow on repurposed content in Open Labyrinth

7.3   Metadata scheme

One of the other key challenges of the project within the first year was the development of the mEducator metadata scheme, taking into consideration the IEEE LOM and other relevant available standards. A process of analysing the suitability and scope of the Healthcare LOM metadata specification was carried out, together with a process for proposing extensions to LOM and Healthcare LOM. Other specifications and standards have been reviewed and their suitability for incorporation in the mEducator schema was assessed. The technical reference group has made actions towards incorporating in the Metadata scheme the repurposing extensions that were proposed by the consortium. A first version of the metadata schema for describing content was proposed, implemented and tested. While researching and testing the schema, the working group agreed that the IEEE LOM and the Healthcare LOM specifications would not be wholly adequate for the start-up of a metadata schema, due to the large number of adoptions required before the schema could be used for mEducator content and scope. It was also felt that the LOM and Healthcare LOM did not reflect current practice in the medical education arena, namely there was little reference to 'repurposing' and 'copyright' within these standards.

Main developments included the elaboration on and inclusion of the elements in the schema meaning to the elicitation of the pedagogical contexts of using the learning resources. A metadata editor was also created as a result of this workstream conducted by the technical reference group. The mEducator metadata scheme has been proposed and will be further tested and validated in the immediate future.

7.4   Metamorphosis

In order to research on the development of an accurate and functional mEducator metadata scheme, the consortium developed an environment where partners would be able to pilot implement and test the mEducator metadata description scheme. This environment consists of an implementation of the ELGG platform, a web 2.0 based social network, which spans two social dimensions: of humans and of educational resources, and was named Metamorphosis.
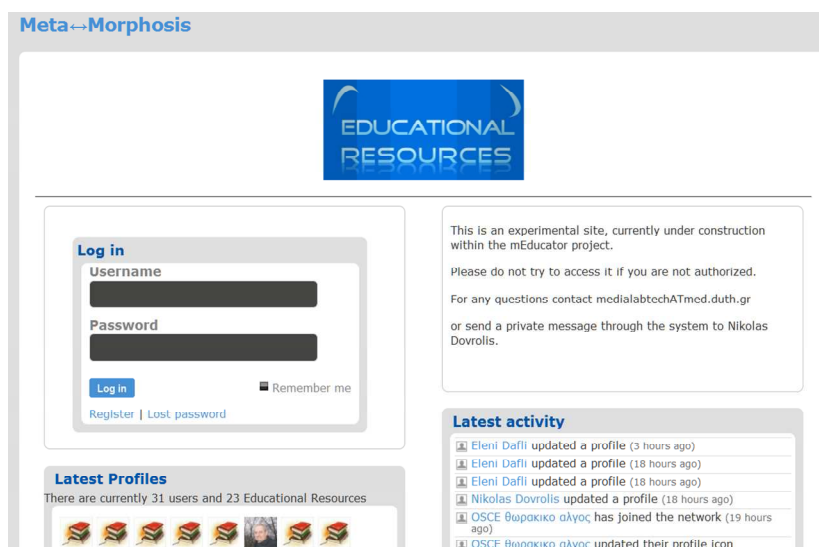

The metamorphosis login page

Metamophosis is used to:

a.   organize selected content
b.   test in practice the mEducator content metadata description scheme during the process of its development, in order to evaluate it and receive and incorporate comments and best practices from the consortium members
c.   test in practice the mEducator *repurposed* content metadata description scheme during the process of its development, in order to evaluate it and receive and incorporate comments and best practices from the consortium members
d.   research on social dynamics as well as pedagogical and technical issues (early exploration of functionalities) pertaining to educational content sharing and repurposing.

7.5   Serious Games re-purposing (Editor)

Some of the mEducator content involves educational resources in the form of serious medical games. To this end, work conducted in the first year of the project involved development work for generating specific scenario wrappers and metadata for re-purposing game-based medical learning content. Such scenarios may be aiming at both trainers and learners. To this extent, some of the work achieved so far, demonstrates developments towards establishing best practices that will be valid for this particular content type. The emphasis and aim is how to go about producing reusable content via content wrappers, scenario editors and web-based tools that, in general, facilitate the repurposing of games along the repurposing axes identified and explained earlier in this report. The aim of the whole development process is to produce reusable content that is easy to use and can involve elements of user generated content of good pedagogical value.
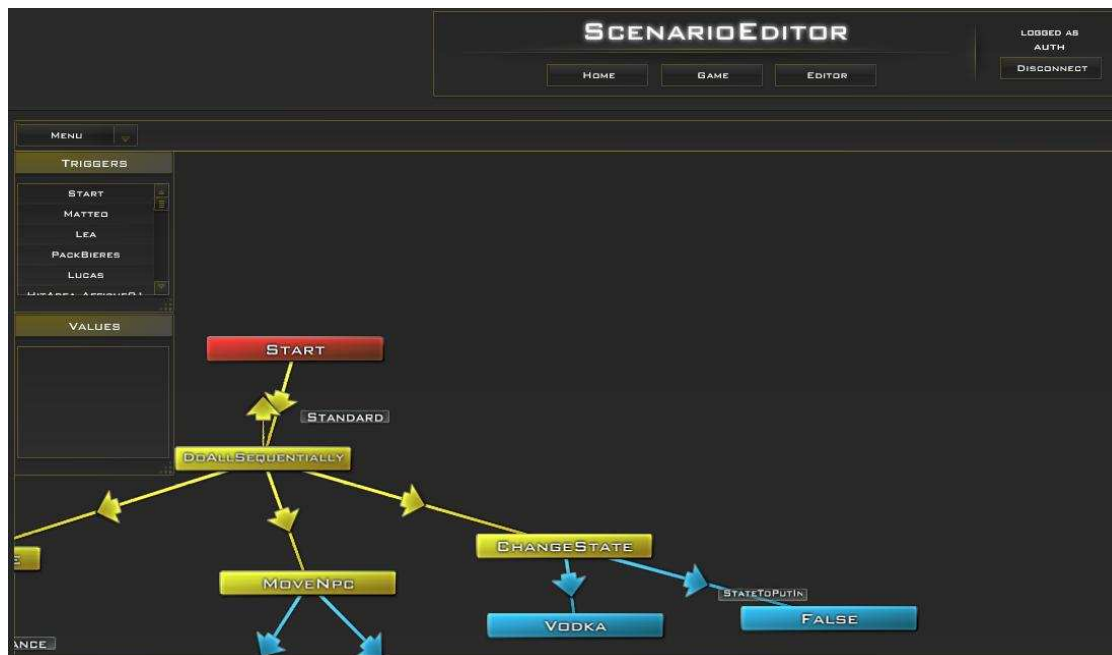
Screenshot of a serious games scenario editor developed

8 Impact & Sustainability

The abundance of medical educational content available in individual EU member countries cannot be used effectively simply because discovery and retrieval are hampered by a lack of standardized terminology and content sharing mechanisms. This need is addressed by mEducator, by building standards and reference mechanisms so that medical educational content can be shared more effectively by EU higher educational institutions. To this end, it is envisaged that mEducator will improve the quality of medical education by allowing the best educational materials to be shared across EU, while eliminating the costs currently incurred through duplication of these materials in multiple institutions. In fact, a number of established reporitories of medical education content are already showing interest in adopting the best practice guidelines and schemes produced by the mEducator project.

In order to derive best practices for medical educational content re-use and sharing, mEducator needs a critical mass of medical educational content types (rather than items), representing various educational approaches (e.g. conventional teaching, active learning, e-learning and blended learning, etc), various audiences, various languages and various cultures. Content in mEducator covers and represents the whole range of medical educational contents, including traditional instructional learning resources (e.g. notes, books, scientific papers, exams, lectures, images, videos, practicals), as well as, resources related to active learning approaches (e.g. problem/case based learning material), or related to novel experiential teaching and studying techniques (e.g. serious medical games), as well as resources unique in the medical domain (e.g. virtual patients, simulation algorithms, evidence based medicine forms, objective standard clinical examination forms, medical annotation tools, anatomy web traces) and content items related to new web 2.0 technologies (e.g. medical wikis, podcasts, blogs).

Finally, it has to be mentioned, that all effort spent so far, as well as any future developments in mEducator envisage to ensure that achievements are sustainable. To this end, mEducator has already started developing a simple licensing model for new content providers (simple users, as well as associated partners) to join in the project network in order to exceed the goals of the project and to broader the network of the partners. Actions are undertaken so as to achieve the creation of a self sustainable service for the managed provision of the network at a European level (but not limited to that).

9 Further Information

In the immediate future, the mEducator consortium will engage with project activities towards:

- the refinement and subsequent finalisation of a metadata schema and its associated tools and environment that will allow a user to effortlessly describe, license and re-purpose their material

- the creation and expansion of a social network of collaborating resource providers

- the development of two mechanisms (technical solutions) for interlinking the resource repositories in a transparent to the user way

- the production of guidelines how to achieve best practices